

## REMARKS

### A. Status of the Application

Claims 1-39 are pending. Claims 18, 19, 30, 31 have been canceled, and claims 1, 5, 6, 15, 25, 27, 27, 33 and 39 have been amended. No new matter was introduced. Claims 1-17, 20-29, and 32-39 remain pending.

### B. Section 102 Rejections

Claims 1-5, 7-11, 15-19, 21-22, 25-28, 30-33, and 36-39 stand rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by the publication entitled "Towards Direct Reconstruction from a Gamma Camera Based On Compton Scattering," by Cree and Bones.

Applicant respectfully disagrees with this rejection and asks that it be reconsidered. The claims, prior to any amendments made above, were not believed to be anticipated by the cited reference. However, to advance prosecution, independent claims 1, 15, 25, 26, 27, and 33 have been amended to incorporate the appropriate completeness condition as described, for example, in the Example section of the Specification.

The Cree and Bones reference fails to anticipate the elements of independent claims 1, 15, 25, 26, 27, and 33. In particular, the Cree and Bones reference fails to teach or suggest the following specific completeness conditions found in, *e.g.*, claim 1:

i) if a plane that intersects a sphere with a radius bigger than a distribution where all surface integrals emanates from the apex whose axis of symmetry is normal to the plane, then

obtaining a distribution of radioactivity from the surface integrals;

or

ii) if a plane that intersects a distribution where all integrated cone-beam line-integrals emanates from the apex whose axis of symmetry is normal to the plane, then obtaining a distribution of radioactivity from the integrated line-integrals.

In contrast, the Cree and Bone reference discloses on page 401, in Theorem 1, that from "a complete set of restricted cone-surface projections, that is,  $\lambda(x,y,t)$  for  $(x,y) \in \mathbb{R}^2$  and  $t \in [0,\infty]$ , the X-ray source distribution  $\mu(x,y,z)$  can be reconstructed." The theorem is interpreted as the

cone-surface projection,  $\lambda(x,y,t)$ , whose apex lies on a infinitely large plane,  $t \in [0,\infty]$ , and axis of symmetry,  $(x,y)$ , is perpendicular to the plane, than the object can be reconstructed. *See* Abstract; *see also* page 400, line 2 which discusses the subset of all the cone-surface projections are satisfied when vector  $\beta$  is equal to vector  $z$ , vector  $\beta$  being the unit vector between the  $x_1$  and  $x_2$  of FIG. 1B. This theorem does not satisfy the completeness condition recited in independent claims 1, 15, 25, 26, 27, and 33.

Furthermore, the Cree and Bones reference fails to teach or suggest line integrals, as recited in independent claim 25. The Cree and Bones reference appears to disclose surface projections, *e.g.*, surface integral models. For example, the Cree and Bones reference discloses “To develop an integral formation of  $\lambda$  for the *cone surface projection*...” *See* the second paragraph under the section entitled “Cone-Surface Projections”; *see also* equation (2).

For at least the above reasons, claims 1, 15, 25, 26, 27, and 33, and their respective dependent claims are patentably distinct over the Cree and Bones reference. Applicant respectfully requests the removal of the § 102 rejection.

### C. Section 103 Rejections

#### 1. Claims 6, 20, and 29 are Patentably Distinct

Claim 6, 20, and 29 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over the Cree and Bones reference in further view of U.S. Patent No. 6,330,298 to Tam *et al.* Applicant respectfully traverses.

As noted above, the Cree and Bones reference fails to teach or suggest a completeness condition, and in particular, a completeness condition where the following specific completeness conditions found in, *e.g.*, claim 1:

- i) if a plane that intersects a sphere with a radius bigger than a distribution where all surface integrals emanates from the apex whose axis of symmetry is normal to the plane, then

obtaining a distribution of radioactivity from the surface integrals;

or

- ii) if a plane that intersects a distribution where all integrated cone-beam line-integrals emanates from the apex whose axis of symmetry is normal to the plane, then  
obtaining a distribution of radioactivity from the integrated line-integrals,

as recited in claim 1. Independent claims 15 and 27 recite a similar element.

First, the combination of Tam and Cree and Bones references as proposed by the Office is improper. The Tam reference is directed to calculating line integrals, where the Cree and Bones reference disclose surface integrals. The suggested modification of the Cree and Bones with the disclosure of Tam would render the Cree and Bones reference unsatisfactory for its intended purpose. If the proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984).

Furthermore, the Tam reference fails to cure the deficiency of the Cree and Bones reference. The Tam reference is directed to imaging of an object based on calculations of data along line segments (L) formed in cone beam projection data. *See* Abstract and Summary of the Invention. Nowhere in the Tam reference is a completeness condition disclosed.

For at least the above reasons, claims 1, 15, and 27, and their respective dependent claims are patentably distinct over the Cree and Bones reference and/or Tam reference. Applicant respectfully requests the removal of the § 103 rejection.

2. *Claims 12-14 are Patentably Distinct*

Claims 12-14 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over the Cree and Bones reference in further view of U.S. Patent No. 6,628,984 to Weinberg *et al.* Applicant respectfully traverses.

As noted above, the Cree and Bones reference fails to teach or suggest all the elements of independent claim 1. The Weinberg reference does not cure the deficiencies. As noted in the previous response to the Office Action mailed 1/9/06, the Weinberg reference is directed to a tomographic imaging system comprising a moveable detector for detecting radiation. *See* Summary of the Invention. Nowhere in the Weinberg reference is a completeness condition discussed or contemplated.

For at least the above reasons, the Weinberg reference, separately or in combination with the Cree and Bone reference, fails to teach or suggest the elements of claim 1 and its dependent claims (including claims 12 through 14). Applicant respectfully requests the removal of the § 103 rejection to claims 12, 13, and 14.

3. *Claim 23 and 24 are Patentably Distinct*

Claims 23 and 24 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over the Cree and Bones reference in further view the reference entitled "Reconstruction of cone-beam projections from Compton scattered data" by Lucas Parra. Applicant respectfully traverses.

The Parra reference does not cure the deficiency of the Cree and Bone reference. In particular, the Parra reference fails to teach or suggest the following specific completeness conditions not found in, *e.g.*, claim 15:

i) if the set of conical integrals comprise surface integrals and if a plane that intersects a sphere with a radius bigger than a distribution where the surface integrals emanate from an apex whose axis of symmetry is normal to the plane, then

obtaining a distribution of radioactivity from the surface integrals;

or

ii) if the set of conical integrals comprise line integrals and if a plane that intersects a distribution where the integrated line-integrals emanate from the apex whose axis of symmetry is normal to the plane, then

obtaining a distribution of radioactivity from the integrated line integrals,

as recited in independent claim 15. In contrast, the Parra reference discloses techniques for obtaining filtered back-projection to generate cone-beam projections directly from the Compton scattered data. *See* ¶4 of the Introduction section. To achieve this, Parra discloses using inverse filtering techniques (*see* Section III) and a back-projection algorithm (*see* Section IV) to reconstruct a source distribution. These techniques fail to describe a completeness condition, as recited in claim 15.

For at least the above reasons, the Parra reference, separately or in combination with the Cree and Bone reference, fails to teach or suggest the elements of claim 15 and its dependent claims (including claims 23 and 24). Applicant respectfully requests the removal of the § 103 rejection to claims 23 and 24.

3. *Claim 34 and 35 are Patentably Distinct*

Claims 23 and 24 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over the Cree and Bones reference in further view of U.S. Patent No. 5,861,627 to Basko *et al.* Applicant respectfully traverses.

The Basko reference fails to cure the deficiency of the Cree and Bones reference. In particular, the Basko reference fails to teach or suggest to satisfy a completeness condition where:

i) if a plane that intersects a sphere with a radius bigger than a distribution where all surface integrals emanates from an apex whose axis of symmetry is normal to the plane, then a distribution of radioactivity from the surface integrals is determined;

or

ii) if a plane that intersects a distribution and all integrated cone-beam line-integrals emanates from an apex whose axis of symmetry is normal to the plane, then a distribution of radioactivity from the integrated line-integrals is determined,

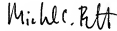
as recited in independent claim 34. Instead, the Basko reference is directed to methods of reconstructing an image using spherical harmonic expansion. *See* Summary of the Invention.

For at least the above reasons, the Basko, separately or in combination with the Cree and Bone reference, fails to teach or suggest the elements of claim 34 and its dependent claims (including claim 35). Applicant respectfully requests the removal of the § 103 rejection to claims 34 and 35.

**CONCLUSION**

Applicant believes that these remarks fully respond to all outstanding matters for this application. Should the Examiner desire to sustain any rejections, the courtesy of a telephone conference between the Examiner, the Examiner's supervisor, and the undersigned attorney at 512-536-3018 is respectfully requested in advance.

Respectfully submitted,



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DATE: October 11, 2006